ABSTRACT

    A network segment 201 including an authentication function 200a, a menu function 200b, a data communication path fixing function 200c, a packet collection function 200d, an

5 accounting information generating function 200e, and an internal content server 202 is connected to part of Internet 300 to cause a user of an information communication terminal 100 such as a portable terminal 101 or a computer 102 to access information resources such as an external content

10 server 301 in the Internet 300, a content server 401 in an Intranet 400 and the internal content server 202 via the network segment 201. In the network segment 201, collection of IP datagram is performed by the packet collection function 200d at the Ethernet packet level. In the data communication

15 path fixing function 200c, communication records including URLs at HTTP level constructed on a TCP/IP protocol are collected, respective collection results are collated, the amount of data per URL (usage purpose) in each information communication terminal 100 is counted, and billing by usage

20 purpose is performed.

SPECIFICATION

DATA ACCOUNTING METHOD AND DATA ACCOUNTING SYSTEM

TECHNICAL FIELD OF THE INVENTION

5   The present invention relates to a data accounting technique, particularly to a technique effective to apply to a data accounting processing along with a data communication using an information network and an access to an information resource on the information network by an information
10 communication terminal such as a portable phone or a personal computer.

BACKGROUND OF THE INVENTION

For example, in a data communication on an information
15 network such as the Internet, data is transmitted/received between computers in a data format called a packet. The form of usage charge of the network used here is roughly classified into a passed-packet-quantity-based accounting type whose accounting target is the quantity of packets (amount of data)
20 and a connecting-time-based accounting type whose accounting target is usage time. In either accounting system, the communication charge is not classified by usage purpose of contents, e-mail and VoIP (Voice Over IP) utilized from a portable terminal such as a computer, portable phone, PHS
25 (Personal Handyphone System), and PDA (Personal Digital Assistant) (hereinafter, collectively called as portable terminal).

In other words, in a conventional technique, a portable

phone or PHS carrier acquires a communication log having the total quantity of packets passing through an in-house network recorded therein, calculates the communication charge based thereon, and further sums the monthly-charge-fixed information

5   providing charge, which is treated as a total usage charge. In this case, it is impossible to specify a usage purpose both in a circuit switching system and in a packet communication system. Thus, a system capable of classifying the communication charge by a usage purpose utilized from a

10 computer or portable terminal is not realized in the conventional data communication.

DISCLOSURE OF THE INVENTION

Along with the spread of computers or portable

15 terminals, data communication systems have been adopted in companies, but in many cases, classification billing of the communication charge by a usage purpose utilized from a personal computer or portable terminal is desired as one of adoption conditions.

20 In other words, in a company and the like, when a portable terminal is used for business, a case where a user has and uses one portable terminal both for public and for private is more convenient than a case where the user has and uses a plurality of portable terminals separately for public

25 and for private from viewpoint of handling of the portable terminal by the user, management by the company, and the like. In this case, there is of course generated at the company side

a demand for clearly classifying the communication charges between those generated by use for accomplishing the business and those generated by private use so as to only pay the communication charge matched with the business purpose (hereinafter, which is denoted as public/private classification), but a problem lies in that it is impossible to conduct such a classification billing of the data communication charge in the conventional technique.

Further, from viewpoint of the mobile phone or PHS carrier which provides data communication services, a technical problem also lies in that, in a conventional comprehensive accounting, it is impossible to provide various services such service improvement by various unit charge settings according to usage purposes, data types, and the like.

It would be desirable for the present invention to provide a data accounting technique capable of realizing usage-based accounting by usage purpose of information network or information resource utilized from an information communication terminal such as a computer or a portable terminal in the data communication of passed-packets-quantity-based accounting type.

It would also be desirable for the present invention to provide a data accounting technique capable of realizing various and accurate accountings according to usage purposes in the data communication utilizing the information network by the information communication terminal.

It would also be desirable for the present invention to provide a data accounting technique capable of realizing both improvement of convenience of the user and the enterprise by use of the information communication terminal both for public and for private, and appropriateness of charge contributions by clarifying the public/private classification of the usage charge of the information communication terminal or the data communication.

It would be further desirable for the present invention to provide a data accounting technique capable or realizing provision of various services by various unit charge settings and the like according to usage purpose or data type.

5   It would be still further desirable for the present invention to provide a data accounting technique capable of grasping information on usage state by usage purpose by the user of the information communication terminal and realizing accurate marketing in the data communication service.

In one aspect the present invention provides a data accounting method for performing accounting according to the amount of data on an information network
10 which a user transmits/receives using an information communication terminal, wherein the amount of data is classified and counted by a usage purpose of the data so that accounting is performed by the usage purpose.

In a second aspect the present invention provides a data accounting system for performing accounting according to the amount of data on an information
15 network which a user transmits/receives using an information communication terminal,

comprising:

a network segment connected to the information network;

data communication path control means for fixing a transmitting/receiving path of the data about the specific
5 user so as to be routed through the network segment;

first data collection means for collecting first information including the amount of data about the data passing through the network segment;

second data collection means for collecting second
10 information which can specify a usage purpose by the individual user of the data passing through the network segment; and

accounting information generating means for generating accounting information about the data by the usage purpose on
15 the basis of the first and second information.

More specifically, by way of example, the network segment is prepared in the information network, and various functions are provided in the network segment. The functions provided in the network segment include a function of
20 collecting packets passing through the network segment (hereinafter, denoted as packet collection function), an authentication function of specifying the user from the portable terminal or computer (hereinafter, denoted as authentication function), a menu function of navigating the
25 user of the portable terminal or computer after authentication, a function of causing all the data communications after authentication to be forcibly routed through the network

segment and specifying the usage purpose (hereinafter, denoted
as data communication path fixing function), and a function of
generating accounting information (hereinafter, denoted as
accounting information generating function).

5   As a usage procedure, the usage purpose of the
authentication function of the network segment is notified to
the user in order that the data communication from the
portable terminal and the computer is performed being routed
through the network segment according to the present invention.

10 In other words, it is notified that the user who desires a
service of public/private classification of the communication
charge of the data communication certainly requires the
authentication in the authentication function of the network
segment.

15   The menu function displays a menu according to a use
frequency of the user who succeeds the authentication to
promote the user to use the same, but is not an essential
function for the present invention.

    Next, according to the data communication path fixing
20 function, there is configured so that the data communication
performed by the user is certainly routed through the network
segment. This data communication path fixing function records
the usage purpose used by the user (hereinafter, denoted as
communication record). All the data passing through the
25 network segment is always recorded by the packet collection
function (hereinafter, denoted as packet record). The
accounting information for realizing usage-based accounting by

usage purpose is generated from the communication record and the packet record by the accounting information generating function.

According to such a data accounting technique of the present invention, it is possible to specify the usage purpose from the information communication terminal, perform summing of the communication charge generated per service, and sum the charge added with the information charge per service of the usage purpose. Further, it is possible to freely set an accounting unit and a unit charge of the communication charge and the information charge.

Further, the information acquired by the packet collection function and the data communication path fixing function enables to provide information about the user who accesses an information resource provided by an information provider to the information provider. For example, a PUSH type marketing for presenting specific information or service to a specific user is enabled from the side of the information provider. In addition, it is possible to provide information about usage state effective for marketing management such as how many times the usage purpose is conducted to the information provider.

It is possible to provide the degree of freedom of accounting with respect to the provider of network or application. For example, it is possible to provide various services such as discounting of the communication charge or the information charge according to the number of times of

utilization, changing of the menu at the usage purpose, and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

5   FIG. 1 is a conceptual diagram showing one example of the entire configuration of a data accounting system for performing data accounting method according to one embodiment of the present invention;

FIG. 2 is a conceptual diagram showing one example of a
10   configuration of the data accounting system for performing data accounting method according to one embodiment of the present invention;

FIG. 3 is a conceptual diagram showing one example of operations of the data accounting method and data accounting
15   system according to one embodiment of the present invention;

FIG. 4 is a conceptual diagram showing one example of the operations of the data accounting method and data accounting system according to one embodiment of the present invention;

20   FIG. 5 is a conceptual diagram showing one example of the operations of the data accounting method and data accounting system according to one embodiment of the present invention;

FIG. 6 is a flow chart showing one example of the
25   operations of the data accounting method and data accounting system according to one embodiment of the present invention;

FIG. 7 is a flow chart showing one example of the

operations of the data accounting method and data accounting
system according to one embodiment of the present invention;

FIG. 8 is an explanatory diagram showing one example of
a menu screen used in the data accounting method and data
5   accounting system according to one embodiment of the present
invention;

FIG. 9 is a block diagram showing one example of the
operations of the data accounting method and data accounting
system according to one embodiment of the present invention;

10   FIG. 10 is a block diagram showing one example of the
operations of the data accounting method and data accounting
system according to one embodiment of the present embodiment;

FIG. 11 is a block diagram showing one example of the
configuration of the data accounting method and data
15   accounting system according to another embodiment of the
present invention; and

FIG. 12 is a flow chart showing one example of the
operations of the data accounting method and data accounting
system according to another embodiment of the present
20   invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Hereinafter, embodiments according to the present
invention will be described in detail with reference to the
25   drawings.

(First embodiment)

FIG. 1 is a conceptual diagram showing one example of

the entire configuration of a data accounting system for
performing data accounting method according to one embodiment
of the present invention, and FIG. 2 is a conceptual diagram
showing one example of a configuration of the data accounting
5   system for performing data accounting method according to the
present embodiment.

FIGs. 3, 4, and 5 are conceptual diagrams showing one
example of operations of the data accounting method and data
accounting system according to the present embodiment, FIGs. 6
10   and 7 are flow charts showing one example of the operations of
the data accounting method and data accounting system
according to the present embodiment, FIG. 8 is an explanatory
diagram showing one example of a menu screen used in the data
accounting method and data accounting system according to the
15   present embodiment, and FIG. 9 is a block diagram showing one
example of the operations of the data accounting method and
data accounting system according to the present embodiment.

In the present embodiment, description will be made by
way of example of a data accounting processing in the case of
20   accessing an information resource on WWW (World Wide Web)
(hereinafter, abbreviated as Web) constructed in HTTP (Hyper
Text Transfer Protocol) on the Internet using the TCP/IP
communication protocol from an information communication
terminal as one example of information network.

25   In other words, URL (Uniform Resource Locator) is used
as pointer information for accessing a specific information
resource in Web, but description will be made by way of

example of the case of identifying a usage purpose of each
user by the URL.

1-1. Design and installation of network

In the present embodiment, provided is a network
5 segment which a user certainly utilizes for enabling an
accounting processing as described later. This is realized as
a network segment connectable or communicable with the
Internet and various network providers. Further, data outside
the target of the data accounting according to the present
10 embodiment is designed not to pass through the present network.
The above condition is satisfied by providing only hardware
realizing each function of the present embodiment and the
minimum network appliances in the network segment.

Specifically, as shown in FIG. 1, there is configured
15 so that a network segment 201 configuring a data accounting
system 200 for performing data accounting method according to
the present embodiment is connected to an Internet 300 to
which a user accesses via an information communication
terminal 100 such as a portable terminal 101 or a personal
20 computer 102 (hereinafter, simply denoted as computer 102),
and an access is made to information resources such as an
internal content server 202 in the network segment 201, an
external content server 301 in the Internet 300, a content
server 401 in an Intranet 400, and the like via this network
25 segment 201.

The data accounting system 200 according to the present
embodiment comprises an authentication function 200a, a menu

function 200b, a data communication path fixing function 200c,
a packet collection function 200d, an accounting information
generating function 200e, and the like.

1-2. Installation of hardware of each function

5   The respective functions such as the authentication
function 200a, the menu function 200b, the data communication
path fixing function 200c, the packet collection function 200d,
the accounting information generating function 200e, and the
like configuring the data accounting system 200 according to
10   the present embodiment are configured by the computer system
and computer software as well as by the network appliance, but
the number thereof and the operating system of the computer
are arbitrary.

FIG. 2 shows a more detailed configuration example of
15   the network segment 201 configuring the data accounting system
200 according to the present embodiment.

In the network segment 201, the computer (not shown)
realizing the respective functions such as the authentication
function 200a to the accounting information generating
20   function 200e is connected to an Ethernet hub 208 to configure
LAN (Local Area Network), and this LAN is connected to the
Internet 300 and the Intranet 400 via a router 207 and a
router 209.

A user management database 203 is connected to the
25   authentication function 200a and the menu function 200b. The
user management database 203 is configured with information
such as user information 203a, a user code 203b, a password

203c, a login ID 203d, a terminal ID 203e, a telephone number 203f, a company name 203g, menu information 203h, and the like.

A communication record database 204 is connected to the data communication path fixing function 200c, and

5 communication records collected in the data communication path fixing function 200c are stored therein. In other words, the communication record database 204 is configured with information such as date and time 204a, a transmission source IP address 204b, a transmission source TCP port number 204c, a

10 terminal ID 204d, a URL 204e, a public/private classification flag 204f, and the like.

The packet collection function 200d is configured with a packet counter 205 and a packet collection database 206. The packet collection database 206 has a transmission

15 destination IP address 206a, a transmission source IP address 206b, a transmission destination TCP port number 206c, a transmission source TCP port number 206d, a sequence number 206e, an identification number 206f, an offset flag 206g, date and time 206h, a data size 206i, and the like stored therein.

20 1-3. Packet collection

All the packets passing through and generated in the network segment 201 according to the present embodiment are collected and recorded by the packet collection function 200d. All the information included in the packets (IP packets in the

25 Ethernet frame) is recorded. The important items are the transmission destination IP address 206a, the transmission source IP address 206b, the transmission destination TCP port

number 206c, the transmission source TCP port number 206d, the
sequence number 206e, the identification number 206f, the
offset flag 206g, the date and time 206h, the data size 206i,
and the like, which are the information included in the

5   standardized IP packets in the Ethernet frame. The packet
records having all the information included in the packet
recorded therein are generated and stored in the packet
collection database 206.

      The transmission source IP address 206b, the

10   transmission source TCP port number 206d, the transmission
destination IP address 206a, and the transmission destination
TCP port number 206c among the stored information are used to
be collated with the communication records stored in the
communication record database 204 generated in the data

15   communication path fixing function 200c so as to specify the
user. The sequence number 206e, the identification number
206f, the offset flag 206g, the date and time 206h, and the
data size 206i are used for specifying the packet generated
when one usage purpose (URL) is utilized and for calculating a

20   total data size thereof.

      1-4. Authentication

      The user of the information communication terminal 100
such as the portable terminal 101 or the computer 102 is
specified by the authentication function 200a. In principle,

25   the login ID 203d and the password 203c are previously issued
and notified to the user. Further, the URL of the
authentication function 200a is notified to the user. The

user certainly performs authentication through the login ID
and the password by the authentication function 203e when
connecting to the network segment 201. The information on the
login ID 203d and the password 203c is held in the user
management database 203. Further, when it is possible to
acquire the unique terminal ID 203e incorporated in the
information communication terminal 100 such as the portable
terminal 101 or the computer 102, the terminal ID 203c is
utilized for authenticating at the same time. In that case,
the information on the terminal ID 203e is also held in the
user management database 203.

Success/fail of the authentication is notified to the
menu function 200b. When the authentication succeeds, a
control proceeds to the menu function 200b. When the
authentication fails, the user is promoted to perform
authentication again within the limited number of times, and
the utilization of the user is stopped when the limited number
of times of fail is exceeded.

The ID information of the authenticated user is also
utilized for public/private classification processing at
issuing a communication charge bill by the accounting
information generating function 200e as necessary.

Actually, the input columns of the login ID and the
password are displayed on the information communication
terminal 100 such as the portable terminal 101 or the computer
102 to cause the user to input the login ID and the password.
When the authentication succeeds, the control proceeds to the

menu function 200b. When the authentication fails, the fact
and the reason therefor, and the input columns of the login ID
and the password are displayed again. When the authentication
fails more than the limited number of times, the login ID is
5   locked (disabled) and the authentication itself of the user is
disabled.

     1-5. Navigation of user by menu

     When the authenticating succeeds, the menu 500 (for
example, FIG. 8) according to the user is displayed in order
10   to restrict the operation of the information communication
terminal 100 such as the computer 102 or the portable terminal
101 so as to have an available usage purpose limited. Which
menu is displayed according to the individual user is
previously registered in the menu information 203h of the user
15   management database 203. When the authenticating fails,
communication is established with the authentication function
200a to confirm that the number of times of fails is within
the limited number of times and to cause the user to retry
authentication. When the limited number of times is exceeded,
20   the fact is notified to the user to stop the utilization.

     In other words, the user information is acquired from
the authentication function 200a, and the menu 500 suitable
for the organization to which the user belongs is displayed on
the information communication terminal 100 such as the
25   portable terminal 101 or the computer 102. When the user
operates according to this menu 500, the menu information 203h
stored in the user management database 203 is referred, and it

is determined whether the URL designated by the selected menu item is physically inside or outside the network segment 201.

Even when the information resource specified by the designated URL is outside the network segment 201, the data

5   communication is certainly routed through the network segment 201 by the data communication path fixing function 200c. Further, the menu items by which the user can directly designate the URL are also prepared, and the data communication thereof is designed to be certainly routed

10   through the network segment 201 even when the user designates the URL from the menu items.

Similarly, with the menu selection by the user, the menu item is classified into for business or for others by the public/private classification information previously set in

15   the menu information 203b, which is recorded.

1-6. Control of user's data communication path

The data communication path fixing function 200c is used to fix the data communication path in order that all the user's communications are routed through the network segment

20   201.

When the information resource specified by the URL is inside the network segment 201 as the access to the internal content server 202, even when the data communication path fixing function 200c is not used, the data communication is

25   certainly routed through the network segment 201. Further, only in this case, the data communication path fixing function 200c generates the communication records recording therein

which URL the user has utilized. The communication records of
the URL designating the information resource outside the
network segment 201 are generated by a remote URL proxy
acquiring function 200c-1 described later. The communication
5 records have the user's terminal ID 204d, the date and time
204a, the URL 204e, the user's transmission source IP address
204b, the user's transmission source TCP port number 204c, the
public/private classification flag 204f, and the like recorded
therein. The collection of the communication records is
10 performed in the protocol hierarchy such as HTTP on the TCP/IP.

      The packet information at all the levels of Ethernet
via the network segment 201 realized in this data
communication path fixing function 200c is stored in the
packet collection database 206 as the packet records by the
15 above packet collection function 200d, and collated with the
information in the communication record database 204 so that
usage-based accounting of the communication charge per URL can
be enabled.

      Like a conventional technique, in the case where the
20 data communication path fixing function 200c according to the
present embodiment is not provided, the data communication for
acquiring the URL (information resource) outside the network
segment 201 from the information communication terminal 100
such as the portable terminal 101 or the computer 102 is not
25 routed through the network segment 201 since the server for
distributing contents of the URL and the portable terminal 101
or the computer 102 are directly communicated. Therefore, all

the packet records cannot be stored and it is impossible to generate the accounting data.

1-7. Proxy acquiring of remote URL

In order to designate and utilize the contents of the external content server 301 on the Internet 300 outside the network segment 201 according to the present embodiment or the information owned by the content server 401 in the Intranet 400 by URL, the remote URL proxy acquiring function 200c-1 temporarily acquires the information resource specified by the URL outside the network segment 201, and transmits it to the portable terminal 101 or the computer 102 at a request source. This remote URL proxy acquiring function 200c-1 configures part of the data communication path fixing function 200c.

The operation example of the remote URL proxy acquiring function 200c-1 will be described below with reference to FIG. 9. By way of example, it is assumed that the Web contents outside the network segment 201 is utilized. The URL of the server of the data communication path fixing function 200c is assumed to be "http://menu.xx.co.jp/." In the server, the menu 500 is displayed to the user who succeeds the authentication. When it is desired that the user refers to "http://www.yyy.com/zzz.html", the link to the URL is set as "http://menu.xx.co.jp/agent.cgi?www.yyy.com/zzz.html" by the menu 500 according to the present embodiment. The portion of "agent.cgi" in this URL is the portion used in the remote URL proxy acquiring function 200c-1. Actually, this character string of "agent.cgi" is arbitrary. When the URL is

designated in such a form, the remote URL proxy acquiring
function 200c-1 acquires all the contents designated by the
URL designated by the character string starting with a
character following "?" and transfers the contents to the
5 user's portable terminal 101 or computer 102. However, when
the links to other URLe (information resources) are included
in the contents, the constant fixing of the data communication
path to the network segment 201 cannot be performed.
Therefore, before the contents are transmitted to the user's
10 portable terminal 101 or computer 102, the contents are
transferred to an address conversion function 200c-2 described
later to acquire the address rewritten into such a form as
"http://menu.xx.co.jp/agent.cgi?www.yyy.com/zzz.html" and
transfer it to the user's portable terminal 101 or computer
15 102.

       This remote URL proxy acquiring function 200c-1 also
generates the communication records in the communication
record database 204.

       1-6, Address conversion in real time

20   In order to constantly function the fact that the
remote URL proxy acquiring function 200c-1 is used to fix the
data communication path so as to pass through the network
segment 201, as shown in FIG. 9, the address conversion
function 200c-2 for converting the address of the contents
25 such as the URL acquired by the remote URL proxy acquiring
function 200c-1 into the above form in real time is provided
as part of the data communication path fixing function 200c.

According to the above example, in the system, the pre-append portion of "http://menu.xx.co.jp/agent.cgi?" is automatically inserted by the address conversion function 200c-2 into all the URLs outside the network segment 201

5 displayed by the data communication path fixing function 200c. In other words, this address conversion function 200c-2 analyzes the URL of the contents acquired by the remote URL proxy acquiring function 200c-1 in real time, performs rewriting into the above URL, and returns the contents to the

10 remote URL proxy acquiring function 200c-1 again. By way of example, when the links to other URLs such as "Up. html", "middle. html", "lower. html", and the like are present in the acquired contents, the contents are analyzed in real time, and these links are detected to be written into the URLs having

15 the forms of
"http://menu.xx.co.jp/agent.cgi?www.yyy.co.jp/Up.html",
"http://menu.xx.co.jp/agent.cgi?www.yyy.co.jp/middle.html",
and "http://menu.xx.co.jp/agent.cgi?www.yyy.co.jp/lower.html."

Accordingly, rewriting is performed in order that all

20 the URLs in the contents acquired by the remote URL acquiring function 200c-1 are routed through the network segment 201 so that the data communication path fixing function 200c can constantly function.

1-9. Content cache

25 In order to provide the data communication path fixing function 200c, the remote URL proxy acquiring function 200c-1, and the address conversion function 200c-2 for more users and

reduce the loads while efficiently operating the functions, a cache function 200f for temporarily holding (caching) the address-converted contents is provided. When the contents are reutilized by other or the same user, the contents temporarily

5   held in the cache function 200f are transferred to the user's portable terminal 101 or computer 102.

    The cached contents are set to be utilized when the remote URL proxy acquiring function 200c-1 acquires the contents. In other words, the remote URL proxy acquiring

10   function 200c-1 confirm presence/absence of the target contents in the cache function 200f at first. The contents in the cache function 200f or the newly acquired contents are transferred to the user's portable terminal 101 or computer 102 when the contents are stored in the cache function 200f or

15   when the contents are not stored, respectively. Accordingly, the record of utilization of the contents temporarily stored in the cache function 200f is also stored in the communication record database 204 by the remote URL proxy acquiring function 200c-1.

20   It is required that the cached contents are periodically updated to be matched with the original contents. The cached contents are erased after a lapse of constant time. The cache function 200f comprises such various functions. Further, in the case of the dynamic contents (for example,

25   contents whose display state is changed according to the user's input contents into the content display screen), the cache function 200f analyzes whether or not it is the dynamic

contents. When it is determined to be the dynamic contents, the contents acquired in the cache function 200f are transferred to the user, and then immediately erased.

According to the above respective functions, the data

5 communication can be made with the user of the information communication terminal 100 such as the portable terminal 101 or the computer 102 with being certainly routed through the network segment 201 after authentication, and the data communication status according to the usage purpose of the URL

10 can be grasped.

1-10. Generation of accounting information

The packet records stored in the packet collection database 206 and the communication records stored in the communication record database 204 are collated to generate the

15 accounting information by the accounting information generating function 200e illustrated in FIG. 10. Specifically, both records are combined to generate the accounting records with the transmission source IP address 204b (206b), the transmission source TCP port number 204c (206d) which are

20 common portions between the record items of the packet records stored in the packet collection database 206 and the record items in the communication record database 204 as a key. One accounting record includes when (date and time 204a), who (terminal ID 204d) utilizes which URL (URL 204e), the total

25 packet data generated for viewing one URL (URL 204e) (total data size 206i relating to the URL 204e), public/private classification information (public/private classification flag

204f), and the like.

The public/private classification information presents the contract information such as a URL list displayed in the manu function 200b, flag information of the URL which has to
5 be billed to the company and the URL which has to be billed to the individual user, designation as to whether the data communication charge not being routed through the data accounting system 200 according to the present embodiment is billed for public or for private, and the like to the manager
10 of the data accounting system according to the present embodiment when the user or the company (company name 203g) to which the user belongs makes contract of the public/private classification billing issuing service using the data accounting system 200 according to the present embodiment.
15 Further, the URL information for separately accounting the amount of information is set in the user management database 203 as part of the user information 203a, for example.

The accounting information generating function 200e generates the user's accounting information on the basis of
20 the accounting records. Specifically, the accounting records are summed per user and the summing is temporarily performed both for public and for private. The communication charge not being routed through the data accounting system 200 according to the present embodiment cannot be classified so that the
25 classification of the public/private classification billing of the communication charge is performed on the basis of the determined items at the contract.

The communication charge not being routed through the data accounting system 200 according to the embodiment means the difference (Δ) between the pre-accounting information and the specification information (call detail record (CDR information 600)) of the data communication charges form the portable phone and PHS company.

The CDR information 600 is configured with the information such as a telephone number 601, a call type/specification type 602, year and month of call 603, a call specification classification/call type 604, the quantity of bytes 605, the quantity of packets 606, a total call charge 607, and the like.

In other words, when it is assumed that the amount of data (the quantity of bytes) corresponding to the specific telephone number 601 (terminal ID 204d) described in the CDR information 600 is G, the total data size 206i relating to the terminal ID 204d obtained by summing the above accounting records by one terminal ID 204 (corresponding to the telephone number 601) is C, the total data size 206i for private relating to the terminal ID 204d is Cp, and the total data size 206i for public relating to the terminal ID 204d is Cj, C (= Cp + Cj)<G is obtained so that Δ = G - C is obtained.

Therefore, when an accounting data sheet 700 is created, the total of Cp, Cj which are the summing results classified into for public and for private by being routed through the data accounting system 200 according to the embodiment and the distribution by the contract item of Δ which is the summing

result obtained by not being routed therethrough is generated
per user (terminal ID 204d), and described in the public
specification column 701 and the private specification column
702, respectively. At this time, though not specifically

5 illustrated, in each of the public specification column 701
and the private specification column 702, the specification
information per individual URL (usage purpose) may be added.

Further, when the basic charge is imposed per terminal
ID 204d irrespective of the amount of data use, it may be

10 added to either Cp or Cj which is the summing result
classified into for public and for private, alternatively may
be proportionally billed according to the proportion of Cp and
Cj.

Further, when this accounting data sheet 700 is created,

15 a function of setting an arbitrary unit charge with respect to
a specific URL (usage purpose), a function of not-accounting a
specific URL (usage purpose), a function of assuming a
plurality of URLs (usage purposes) as one accounting unit and
treating the unit as a target of unit charge setting, a

20 function of accounting the amount of information are used,
respectively, to add the information of the communication
charge and the amount of information of the URL (usage
purpose) to the pre-accounting information. Further, a
reduction may be performed according to the total amount of Cp

25 and Cj of the communication charges for public and for private.

With the above accounting information generating
function 200e, the usage-based accounting by usage purpose can

be enabled in the data communication using the information
network such as the Internet 300 or the like. Further, the
public/private classification of the communication charge and
the amount of information can be realized at the same time.

5   In the above description of the accounting information
generating function 200e, by way of example, there is assumed
a case where the total number of packets of the portable
terminal 101 such as a portable phone and a PHS is provided
from the company in the form of data such as the CDR
10 information 600 or the like, but the accounting information
such as the accounting data sheet 700 and the like may be
generated only by calculating with the data accounting system
200 according to the present embodiment.

       Hereinafter, one example of the entire operation of the
15 data accounting method and data accounting system according to
the present embodiment will be described with reference to
FIGs. 3, 4, 5, 6, and 7.

       At first, in the network segment 201 of the data
accounting system 200, the communication data passing through
20 the network segment 201 is always monitored and recorded in
the packet collection function 200d composed of the packet
counter 205 and the packet collection database 206 at the
level of Ethernet.

       In this state, at an arbitrary time, when the user
25 accesses the authentication function 200a of the data
accounting system 200 via the Internet 300 by using the URL
previously notified to the user of the information

communication terminal 100 via e-mail or the like (step 10,
step 11, step 15), the input screen of the login ID and the
password is displayed (step 12). After the login ID and the
password are input (step 13), the user authentication is

5   performed for collating with the login ID and the password
input by referring to the entry of the login ID 203d and the
password 203o of the user management database 203 (step 14).
When the authentication fails, the inputting of the login ID
and the password is retried for the predetermined limited

10   number of times (step 16, step 17). When the retry is
performed more than the allowed number of times, an error
display indicating the fact is performed (step 18), the
account of the login ID is locked (step 24) to disconnect the
line (step 25).

15   When the authentication succeeds, the screen of the
menu 500 as illustrated in FIG. 8 is displayed to cause the
user to select each item (step 19).

A determination is made as to whether or not the user-
selected item in the menu 500 is directed for accessing the

20   information resource (internal content server 202) in the
network segment 201 (step 20). In the case of an access to
the network segment 201, in an access path A1 and an access
path A2 shown by dashed lines in FIG. 3, the contents of the
internal content server 202 are viewed by the user of the

25   information communication terminal 100, and the communication
records are recorded in the communication record database 204
per utilization of the contents (URL) of the internal content

server 202 (step 21). In this case, various processings by the data communication path fixing function 200c in FIG. 9 are not required and performed.

On the other hand, when the user-selected item in the
5 menu 500 is directed for accessing the information resource (external content server 301 or content server 401 of the intranet 400) outside the network segment 201, various processings by the above data communication path fixing function 200c in FIG. 9 are performed. (In the case of an
10 access to the external content server 301, in an access path A3, an access path A4, an access path A5, and an access path A6 shown by dashed lines in FIG. 4.) (in the case of an access to the content server 401 in the intranet 400, in an access path A7, an access path A8, an access path A9, and an access
15 path A10 shown by dashed lines in FIG. 5.) the path control is performed in order that the communication data is certainly routed through the network segment 201 (step 26), and the communication records are recorded in the communication record database 204 (step 27).

20   Here, in the processing of the data communication path fixing function 200c in step 26, as illustrated in FIG. 7, presence/absence of the target contents in the cache function 200f is examined at first (step 26a). When cache hit occurs, the contents in the cache function 200f are transmitted and
25 viewed by the user (step 26b), and the communication records are recorded in the communication record database 204 (step 26c).

When the target contents are not present in the cache function 200f, the remote URL proxy acquiring function 2000-1 is activated (step 26d). While a value of the URL error counter for managing the number of times of fail of URL proxy

5   acquiring is equal to or lower than a predetermined allowance value (step 26e), the URL proxy acquiring described above in FIG. 9 is tried (step 26f), and success/fail of the acquiring is determined (step 26g). When the proxy acquiring succeeds, after the address conversion function 2000-2 is activated to

10 apply address conversion to the contents (step 26h), the contents after conversion is written into the cache function 200f (step 26i), and the contents are viewed by the user via the cache function 200f (step 26b). When the proxy acquiring fails in step 26g, the URL error counter is counted up (step

15 26m), and step 26d and succeeding steps are repeated. When the URL error counter exceeds the allowance value in step 26e, the error message indicating that the proxy acquiring of the contents specified by the URL fails is displayed (step 26j) to disconnect the line (step 26k).

20   Returning to the flow chart of FIG. 6, when the access to the individual URL is ended, public/private classification of the access is determined on the basis of the public/private classification per URL (step 22), the public/private classification is set in the public/private classification

25 flag 204f (step 23, step 28), the control returns to the display processing of the menu 500 in step 19, and step 19 and succeeding steps are repeated until logout.

As described above, in the data accounting method and data accounting system according to the present embodiment, there are advantages in which the efficiency for acquiring the communication records can be improved, the number of processings of packet counting and the time for counting processing can be reduced, and the accounting function can hold the high degree of freedom.

In other words, according to the data accounting method and data accounting system of the present embodiment, in the data communication of passed-packets-quantity-based accounting type using the information network such as, for example, the Internet 300, it is possible to realize the usage-based accounting by usage purpose of the information network or information resource utilized from the information communication terminal 100 such as the computer 102 or the portable terminal 101.

Further, in the data communication utilizing the information network such as the Internet 300 or the like by the information communication terminal 100, various and accurate accountings according to usage purposes can be enabled.

Further, it is possible to realize both improvement of convenience of the user and the enterprise by use of the information communication terminal 100 both for public and for private, and appropriateness of charge contributions by clarifying the public/private classification of the usage charge of the information communication terminal 100 or the

data communication.

Further, it is possible to realize provision of various services by various unit charge settings and the like according to usage purpose or data type specified by the URL or the like on the Internet 300.

Furthermore, it is possible to grasp information on usage state by usage purpose by the user of the information communication terminal 100 and to realize accurate marketing in the data communication service.

10 (Second embodiment)

FIG. 11 is a block diagram showing one example of a configuration of the data accounting method and data accounting system according to another embodiment of the present invention, and FIG. 12 is a flow chart showing one

15 example of the operations thereof.

In this second embodiment, by way of example, there is shown the case of being applied to e-mail on the Internet 300. In other words, in this embodiment, description will be made with a usage purpose as e-mail. Further, description of

20 identical portions to those in the first embodiment will be omitted.

2-1. Design and installation of network

The same as the first embodiment.

2-2. Installation of hardware of each function

25 The same as the first embodiment.

2-3. Packet collection

The same as the first embodiment.

2-4. Authentication

The same as the first embodiment.

2-5. Navigation of user by menu

When the authentication succeeds, the menu is displayed
5 in order to restrict transmitting/receiving of e-mails in the
computer 102 or the portable terminal 101. When the
authentication fails, communication is established with the
authentication function 200a to confirm that the fail is
within the limited number of times and to cause the user to
10 retry the authentication. When the limited number of times is
exceeded, the fact is notified to the user to stop the use.

Even when the e-mail address to be transmitted is
outside the network segment 201, the data communication is
certainly routed through the network segment 201 according to
15 the present embodiment by the data communication path fixing
function 200c.

Further, according to the public/private classification
information such as a previously set e-mail address or the
like, the e-mail address is classified into for business or
20 for others, which is recorded.

2-6. Control of user's data communication path

The data communication path is fixed in order that the
e-mail communication by the user is all routed through the
network segment 201 according to the present embodiment by
25 using a remote e-mail proxy transfer function 200c-3 and an
address conversion function 200c-4 described later of the data
communication path fixing function 200c.

When the e-mail address is inside the network segment
201 according to the present embodiment, even when the data
communication path fixing function 200c is not used, the data
communication is certainly routed through the network segment

5   201 according to the present embodiment. Further, only in
this case, the data communication path fixing function 200c
generates the communication records having both to which e-
mail address the user transmits e-mail and from which e-mail
address the user receives e-mail recorded therein, and stores

10 in the communication record database. The remote e-mail
address proxy transfer function 200c-3 described later
generates the communication records of the e-mail address
outside the network segment 201 according to the present
embodiment. The communication records have a user ID, date

15 and time, transmitting/receiving destination e-mail addresses,
a user's IP address, a user's TCP port number, and the like
recorded therein.

All the packet information being routed through the
network segment 201 according to the present embodiment

20 realized in this function is stored in the packet collection
database 206 as the packet records by the packet collection
function 200d so that the usage-based accounting of
communication charge per e-mail can be enabled.

Like the conventional technique, in the case where this

25 function is not provided, the data communication for
transmitting/receiving e-mails outside the network segment 201
to/from the portable terminal 101 and the computer 102 is not

routed through the network since the e-mail server and the
portable terminal or the computer are directly communicated.
All the packet records are not stored, and it is impossible to
generate the accounting data.

5   2-7. Transfer of remote e-mail address

       In order to utilize the e-mail address outside the
network segment 201 according to the present embodiment, the
remote e-mail address proxy transfer function 200c-3
temporarily acquires the e-mail address inside the network
10   segment 201 according to the present embodiment, and causes
the portable terminal 101 or the computer 102 to transmit or
receive the same. This remote e-mail proxy transfer function
200c-3 is mounted as part of the data communication path
fixing function 200c.

15   With reference to FIG. 11, an operation example of the
actual remote e-mail proxy transfer function 200c-3 will be
shown below. By way of example, there will be assumed a case
where e-mail is transmitted to an outside e-mail address. It
is assumed that an address of the server of the data
20   communication path fixing function 200c is "aaa.bbb.co.jp" and
an address of the user is "ccc@aaa.bbb.co.jp". When the user
wants to transmit e-mail to "zzz@xxx.yyy.co.jp", he/she
rewrites the e-mail address into
"zzz#xxx.yyy.co.jp?ccc@aaa.bbb.co.jp". The portion of "?" in
25   this e-mail address is the remote e-mail proxy transfer
function 200c-3. Actually, the character string of "?" and
"#" is arbitrary. When the e-mail address is designated in

such a manner, the remote e-mail proxy transfer function 200c-3 transfers the e-mail to the e-mail address designated by the character string before "?". "#" is a substitute for "@".

This remote e-mail proxy transfer function 200c-3 also
5   generates the communication records in the communication record database.

2-8. Address conversion in real time

Though the remote e-mail proxy transfer function 200c-3 can be used to fix the data communication path, in order to
10 constantly function the function 200c-3, the remote e-mail proxy transfer function 200c-3 requires the address conversion function 200c-4 for converting to the e-mail address which the account-having user always uses in real time.

According to the above example, in the system of the
15 remote e-mail proxy transfer function 200c-3, the post-append portion of "?ooo@aaa.bbb.co.jp" is automatically inserted and "@" at the transfer destination is rewritten into "#". In other words, this address conversion function 200c-4 analyzes the arrived e-mail in real time to convert into the e-mail
20 address which the user always uses, and then transfers the e-mail. By way of example, when the user's usual e-mail address is "ooo@111.222.co.jp", the e-mail address is analyzed in real time, and is changed from "ooo@aaa.bbb.co.jp" into "ooo@111.222.co.jp" so that the e-mail is transferred.

25 Accordingly, all the e-mails acquired in the remote e-mail proxy transfer function 200c-3 are routed through the network segment 201 according to the present embodiment. This

address conversion function 200c-4 is part of the remote e-mail proxy transfer function 200c-3.

2-9. Cache of e-mail

In order to provide the data communication path fixing function 200c, the remote e-mail proxy transfer function 200c-3, and the address conversion function 200c-4 for more users and to reduce the loads while efficiently operating the functions, the e-mail data is cached, and the cached e-mail data is utilized at the same time with transmitting/receiving multiple e-mails. This is realized by the cache management function 200c-5. The cached e-mail is transferred, and then is immediately erased.

2-10. Generation of accounting information

The same as the first embodiment.

FIG. 12 is a flow chart exemplifying the entire operation of the e-mail transfer processing according to the second embodiment.

In other words, when the data communication path fixing function 200c is activated along with e-mail transferring (step 30), the remote e-mail proxy transfer function 200c-3 performs e-mail transfer processing while managing a predetermined transfer error (step 31, step 32, step 33, step 34, step 40, step 39). When the transfer succeeds, after address conversion is performed by the address conversion function 200c-4 (step 35), presence/absence of LAN broadcast transmission is determined (step 36). When the LAN broadcast transmission is performed, the cache management function 200c-

5 is utilized (step 37). In the case other than the LAN
broadcast transmission, e-mail distribution is directly
performed, access recording per e-mail utilization is
performed in the data collection in the protocol hierarchy
5   such as an e-mail protocol higher than the TCP/IP hierarchy to
be stored in the communication record database (step 38). It
is identical to the first embodiment that the data collected
in the communication record database is collated with the
collection result in the packet collection function 200d for
10 performing data collection at the level of Ethernet so that
accounting processing per e-mail address, that is instead use
is performed.

According to the second embodiment, the same effects as
the first embodiment can be obtained, and it is possible to
15 realize accounting processing capable of public/private
classification including e-mail service.

Specific description is given to the present invention
made by the present inventor on the basis of the embodiments,
but it goes without saying that the present invention is not
20 limited to the above embodiments, and may be variously
modified without departing from the spirit of the invention.

For example, the data accounting technique according to
the present invention may be applied to not only the data
communication but also a speech coding data communication
25 system (Voice over IP system, Voice over Frame Relay system,
or the like) using the similar method. Thus, the present
invention can be applied to a communication system for

simultaneously transmitting/receiving speech and data. Therefore, the public/private classification can be performed for the speech call in the speech coding data communication system.

5

INDUSTRIAL APPLICABILITY

According to the data accounting method of the present invention, in the data communication of passed-packets-quantity-based accounting type, an effect can be obtained in

10 which it is possible to realize usage-based accounting by usage purpose of information network or information resource utilized from an information communication terminal such as a computer or a portable terminal.

According to the data accounting method of the present

15 invention, an effect can be obtained in which it is possible to realize various and accurate accountings according to usage purposes in the data communication utilizing the information network by the information communication terminal.

According to the data accounting method of the present

20 invention, an effect can be obtained in which it is possible to realize both improvement of convenience of the user and the enterprise by use of the information communication terminal both for public and for private, and appropriateness of charge contributions by clarifying the public/private classification

25 of the usage charge of the information communication terminal or the data communication.

According to the data accounting method of the present

invention, an effect can be obtained in which it is possible to realize provision of various services by various unit charge settings and the like according to usage purpose or data type.

5   According to the data accounting method of the present invention, an effect can be obtained in which it is possible to grasp information on usage state by usage purpose by the user of the information communication terminal and to realize accurate marketing in the data communication service.

10   According to the data accounting system of the present invention, in the data communication of passed-packets-quantity-based accounting type, an effect can be obtained in which it is possible to realize usage-based accounting by usage purpose of information network or information resource

15   utilized from an information communication terminal such as a computer or a portable terminal.

According to the data accounting system of the present invention, an effect can be obtained in which it is possible to realize various and accurate accountings according to usage

20   purposes in the data communication utilizing the information network by the information communication terminal.

According to the data accounting system of the present invention, an effect can be obtained in which it is possible to realize both improvement of convenience of the user and the

25   enterprise by use of the information communication terminal both for public and for private, and appropriateness of charge contributions by clarifying the public/private classification

of the usage charge of the information communication terminal
or the data communication.

Accordingly to the data accounting system of the present
invention, an effect can be obtained in which it is possible
5 to realize provision of various services by various unit
charge settings and the like according to usage purpose or
data type.

According to the data accounting system of the present
invention, an effect can be obtained in which it is possible
10 to grasp information on usage state by usage purpose by the
user of the information communication terminal and to realize
accurate marketing in the data communication service.

The claims defining the invention are as follows:

1.   A data accounting method for performing accounting according to the amount of data on an information network which a user transmits/receives using an information communication terminal, wherein first address information
5   which specifies an information resource on the information network and is generated when the user transmits/receives the data is dynamically updated so as to contain second address information specifying a network segment set in the information network to transmit/receive the data for the user
10 by being routed through the network segment, and the amount of data is classified and counted by a usage purpose of the data in the network segment so that the accounting is performed by the usage purpose.

15

2.   A data accounting method according to claim 1, wherein the data about an information resource on the information network requested by the user is temporarily acquired in the network segment, and then transferred to the
20 information communication terminal of the user at a request source so that the amount of data by the individual usage purpose is counted.

3. A data accounting method according to claim 1 or 2,
25 wherein, in a different protocol hierarchy in a communication protocol of the data in the information network, address information on the information network along with the data is

collected and collated so that the amount of data is
classified and counted by the usage purpose of the data.

     4. A data accounting method according to claim 1, 2, or
5 3, wherein at least one of an accounting unit cost and a
billing destination of the data is set by the usage purpose so
that accounting is performed.

     5. A data accounting method according to claim 1, 2, 3,
10 or 4, wherein the information network is the Internet for
transmitting/receiving the data in a TCP/IP communication, the
information communication terminal is a mobile communication
terminal or personal computer, and the data is a packet of the
TCP/IP communication.

15

     6.   A data accounting system for performing
accounting according to the amount of data on an information
network which a user transmits/receives using an information
communication terminal, comprising:
20   a network segment connected to the information network;
       data communication path control means including an
address conversion function of dynamically updating first
address information which specifies an information resource on
the information network and is generated when the user
25 transmits/receives the data so as to contain second address
information specifying the network segment in the information
network, for fixing a transmitting/receiving path of the data

about the specific user so as to pass through the network
segment;

first data collection means for collecting first
information including the amount of data about the data
5   passing through the network segment;

second data collection means for collecting second
information which can specify a usage purpose by the
individual user of the data passing through the network
segment; and

10   accounting information generating means for generating
accounting information about the data by the usage purpose on
the basis of the first and second information.

7. A data accounting system according to claim 6,
15   comprising:

user authentication means for specifying the user of
the information communication terminal; and

menu presenting means for guiding an access to the
information network routed through the network segment by the
20   user.

8. A data accounting system according to claim 6,
wherein the first and second data collection means perform
collecting of the first and second information in a different
25   protocol hierarchy in a communication protocol of the data in
the information network.

9.   A data accounting system according to claim 6, wherein the data communication path control means includes an information resource proxy acquiring function of temporarily acquiring the data about an information resource
5 on the information network requested by the user in the network segment, and then transferring it to the information communication terminal of the user at a request source.

10. A data accounting system according to claim 6,
10 wherein the information network is the Internet for transmitting/receiving the data in a TCP/IP communication, the information communication terminal is a mobile communication terminal or personal computer, and the data is a packet of the TCP/IP communication.
15

11. A data accounting system according to claim 6, wherein the accounting information generating means sets at least one of an accounting unit cost and a billing destination of the data for the usage purpose so that accounting is
20 performed.

12.   A data accounting method according to claim 1, wherein, with respect to the first address information specifying the information resource, public/private
25 classification information for classifying the usage purpose into a private use of the user or a business use in a company to which the user belongs is set, the amount of data is

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separately summed and accounting is separately performed for the user and for the company on the basis of the public/private classification information.

13.   A data accounting system according to claim 6, wherein second information is public/private classification information for classifying the usage purpose into a private use of the user or a business use in a company to which the user belongs, the amount of data is separately counted and accounting is separately performed for the user and for the company on the basis of the public/private classification information.

14.   A data accounting method substantially as hereinbefore described with reference to accompanying figures 6 to 12.

15.   A data accounting system substantially as hereinbefore described with reference to accompanying figures 1 to 5.

Dated : 13 September 2005

Freehills Patent & Trade Mark Attorneys
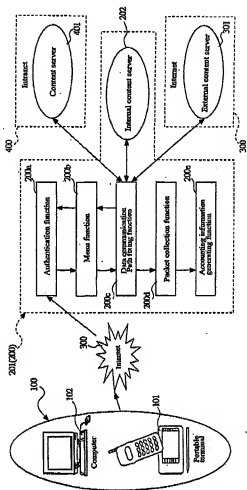Patent & Trade Mark Attorneys for the Applicant/s:
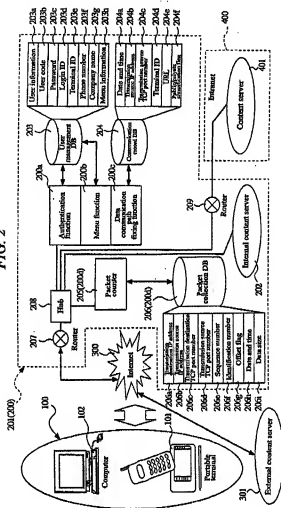
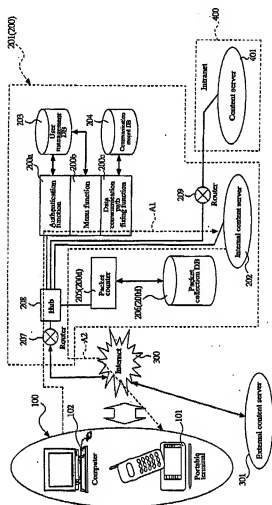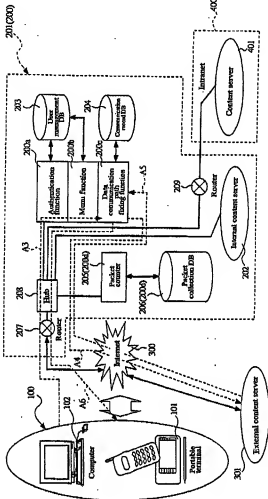Japan Communications Inc

FIG. 1

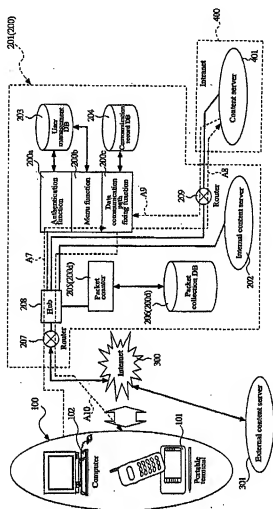**FIG. 2**
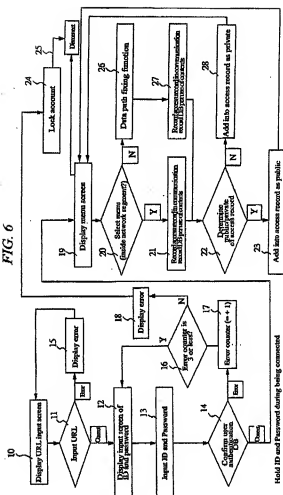
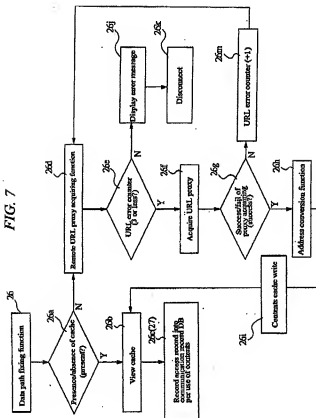FIG. 3

FIG. 4

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FIG. 5

FIG. 6

FIG. 7

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FIG. 8

Select service from following menu

> 1: Attendance book

2: Sales report

3: Market research

4: Company's credit check

5: Financial information

6: In-house inventory

information

7: In-house telephone book

8: Speech call

9: End

0: Internet
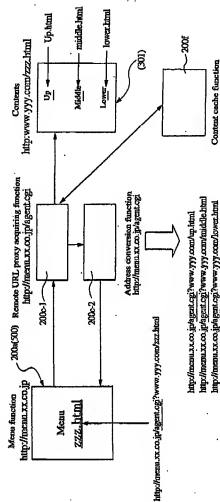
500

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FIG. 9

FIG. 10

FIG. 11

Remote e-mail proxy transfer function
http://aaa.bbb.co.jp/mail.cgi

200c-3

200c-5

E-mail text

Context cache function

Menu function
http://aaa.bbb.co.jp

200a(500)

Menu
Transmission
Mr. Z

200c-4

Address conversion function
ccc@aaa.bbb.co.jp

ccc@111222.co.jp

zzz@xxx.yyy.co.jp/ccc@aaa.bbb.co.jp

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FIG. 12

30 — Data communication path timing function

31 — Remote e-mail/proxy transfer function

32 — Transfer event counter (# at start)
  - N → 39 Disconnect
  - Y →

33 — Transfer e-mail

34 — Success/Fail of transfer
  - N → 40 Transfer error counter (+t)
  - Y → 35 Adopt conversion function

36 — Presence/absence of LAN broadcast
  - N →
  - Y → 37 Use cache → 38 Record access record (in communicating group DB per use of e-mail)

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